some one species three chromosomes only, and these were securely fixed in the form of three equal straight rods crossing one another at right angles in the centre of the nucleus), then, and only then, would a mechanical or physico-chemical theory of heredity and development be plausible or at all possible. But what are the facts ?

First, it has been shown that by centrifuging egg-cells it is possible to cause great changes in the distribution within them of the more formed and solid parts of their contents; and that such eggs, with the spatial relations between the various parts of their contents radically altered, may nevertheless develop normally (or nearly so), each producing an adult, or at least a larva or embryo, conforming to the pattern of the species. It has been suggested, as a way out of this difficulty for the mechanical theory, that the whole egg is pervaded with a network of highly elastic and extensible threads to which all the essential particles or molecules are attached, so that after displacement the network again draws them back into their normal positions : a desperate and unacceptable suggestion ; for apart from the lack of all other evidence of such a network and the improbability of the attachment to it of all contents which pky a part, direct or indirect, in determining the course of development, we have the fact that the altered distribution visibly and long outlasts the disturbing forces of the centrifuging process ; even if in the course of considerable time there is some restitution of the normal distribution.

But more important is the fact that in the

course of nature the genes themselves undergo various shiftings of their relative positions. Commonly, it would seem, the genes of any one chromosome are held in their normal order of succession within it, like pieces of candy in a